

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 14-16, 18-19, 21-22, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al (US 5,980,629) in view of Watanabe et al (US 6,106,610).

In a method of forming a crucible for production of silicon single crystals, note entire reference, Hansen et al teaches a crucible has inner and outer coatings of a devitrification promoter (col 3, ln 1-50 and col 4, ln 40-55). Hansen et al also teaches granular polycrystalline silicon is loaded into the crucible (col 3, ln 50-67) and the devitrification promoter is preferably barium, magnesium, strontium or beryllium (col 6, ln 20-5). Hansen et al also teaches devitrification promoters includes metal oxides, carbonates, oxalates and ion pairs of a metal

cation and organic anions (col 6, ln 1-65), this clearly suggests applicant's metal salts, metal organic acid salt, and barium carbonate.

Hansen et al does not teach the crystallization promoter is dispersed in a silica matrix. Hansen et al is not particular about the method used to coat the surface of the crucible.

In a method of forming a crucible, note entire reference, Watanabe et al teaches a crystallization promoter can be used either alone or as a mixture with a powder of synthetic silicon dioxide to form a translucent quartz glass layer. Watanabe et al teaches depositing a synthetic silicon dioxide powder sufficiently impregnated with the aqueous solution, and the layer is formed as a coated film or a solid solution layer on the surface (col 3, ln 30-65 and col 4, ln 1-35), this reads on applicant's crystallization promoter dispersed in a silica matrix. Watanabe et al also teaches a crystallization promoter layer is fused to a base body (col 5, ln 5-30). Watanabe et al also teaches a transparent internal quartz layer (col 5, ln 55-67).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Hansen et al by fusing the layer with a crystallization promoter dispersed in a silica matrix to the base body as taught by Watanabe et al to improve adherence and improve safety by reducing the risk of inhalation and ingestion of the promoter ('629 col 8, ln 10-35).

Referring to claim 14, the combination of Hansen et al and Watanabe et al teaches a concentration of  $1 \times 10^{-5}$  to  $1 \times 10^{-8}$  M/cm<sup>2</sup> ('610 claims 3 and 11). Overlapping ranges are prima facie obvious (MPEP 2144.05).

As to the "transparent coated layer consisting of a crystallization promoter and a silica matrix," the combination of Hansen et al and Watanabe et al teaches a silicon dioxide powder

impregnated with a crystallization promoter and is silent to other elements, thus meets the claimed limitation ('610 col 3, ln 30-40).

As to the mechanical strength limitation and the coated layer not being scratched and not changing upon acid washing, the combination of Hansen et al and Watanabe et al teaches a similar method of forming a coated layer by dispersing a crystallization promoter within a silica matrix, as applicant; therefore the properties are expected to be the same because a similar method is expected to produce a product with similar properties. Furthermore, the combination of Hansen et al and Watanabe et al teaches the promoter is fused to the base body ('610 col 5, ln 5-30), which clearly suggests that the promoter is strongly adhered to the base body.

As to a crystallization promoter uniformly dispersed, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Hansen et al and Watanabe et al by dispersing the promoter uniformly because having uniform properties would have been desirable.

Referring to claim 15, the combination of Hansen et al and Watanabe et al does not disclose the claimed method of obtaining the crucible using a partial hydrolyzate of alkoxysilane oligomer, which is a product-by-process claim and the patentability determination of a product-by-process claim is based on the patentability of the product and does not depend on its method of production (MPEP 2113). The combination of Hansen et al and Watanabe et al teaches a crucible, which meets all of the claimed product limitations of claim 15. The same arguments apply for claims 16 and 18-20, which specify the liquid used to obtain the crystallization promoter layer.

Referring to claims 21-24 and 26, the combination of Hansen et al and Watanabe et al teaches a crystallization promoter layer **24, 26** on the inside and outside surfaces of the crucible and polysilicon in the crucible. ('629 Fig 1 and col 12, ln 25-35).

### ***Response to Arguments***

3. Applicant's arguments filed 6/24/2009 have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the crystallization promoter is uniformly dispersed in the inside surface of the crucible) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The claim merely requires the promoter is uniformly dispersed in the silica matrix. Watanabe et al teaches the synthetic silicon dioxide powder is sufficiently impregnated with the aqueous solution of crystallization promoter (col 3, ln 30-40), thus one of ordinary skill would have found it obvious to have the promoter uniformly dispersed to obtain uniform properties, as discussed above in the rejection.

Applicant's argument that Watanabe et al does not teach a transparent coated layer consisting of a crystallization promoter and a silica matrix is noted but not found persuasive. Watanabe et al teaches the synthetic silicon dioxide powder is sufficiently impregnated with the aqueous solution of crystallization promoter (col 3, ln 30-40), which reads on the claimed limitation.

Applicant's argument regarding the mechanical strength is noted but not found persuasive. Watanabe et al teaches fusing silicon dioxide powder impregnated with crystallization promoter; therefore the crystallization promoter is expected to be strongly adhered to the crucible because the material is fused rather than merely dried barium carbonate powder. As discussed above in the rejection, the Examiner admits the prior art is silent to the claimed properties, however the Examiner maintains the properties would be expected because the method of forming the crystallization promoter is similar to the method taught by applicant and because the material is fused within the silicon powder forming the inner layer.

#### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. SONG whose telephone number is (571)272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song  
Examiner  
Art Unit 1792

MJS  
October 26, 2009

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*Primary Examiner, Art Unit 1792*